

WE CLAIM:

1. An endpoint processor unit, comprising:
 - a processor block;
 - a timer block that is arranged to provide at least one time based signal to the
 - 5 processor block;
 - a memory block that is arranged to cooperate with the processor block;
 - an analog-to-digital converter that is arranged to provide an interface
 - between an analog signal and the processor block, wherein the analog signal includes
 - encoded data from a power signal, wherein the processor block is arranged to control a
 - 10 sampling rate that is associated with the analog-to-digital converter such that the analog
 - signal is down-converted as an under-sampled signal, and wherein the processor block is
 - arranged to extract the encoded data from the down-converted signal by executing a digital
 - signal processing algorithm that is stored in the memory block, wherein the digital signal
 - processing algorithm is arranged to reject fundamental and harmonic frequencies that are
 - 15 associated with a power-line frequency that is associated with the power signal.

2. A method for event processing in an endpoint, comprising:
 - executing an idle function while waiting for an event;
 - detecting a trigger for the event;
 - evaluating the event after the trigger is detected;
 - 20 processing a received packet when the event corresponds to a received
 - packet detection;
 - recording at least one metering parameter when the event corresponds to a
 - scheduled recording cycle;
 - formatting a packet for transmission when the event corresponds to a
 - 25 scheduled reporting cycle; and

starting a packet transmission after formatting the at least one packet for transmission.

3. The method of claim 2, further comprising:

detecting a power-up condition;

5 evaluating the power-up condition to determine a power-fault status; and

updating power-failure statistics when a power-fault is detected, wherein the power-fault status corresponds to at least one of: initial power-up, momentary interruption, momentary event, and sustained interruption.

4. The method of claim 2, wherein processing the received packet further

10 comprises:

checking the received packet for errors;

trapping an error condition when the received packet contains errors;

extracting a command from the received packet when the received packet does not contain errors; and

15 processing the command.

5. The method of claim 4, wherein processing the command comprises at least

one of: assigning a transmit frequency, assigning a channel, assigning a sub-channel, defining a CRC, defining a packet format, synchronizing a date, synchronizing a time, updating a time-of-use map, adjusting a peak setting, selecting a transmission start time, selecting a time for recording electric meter readings, assigning an endpoint to a group, resetting the system, and starting a demand reporting interval.

6. The method of claim 4, wherein checking the received packet for errors

includes calculating a CRC associated with the received packet.

7. The method of claim 2, wherein processing the received packet further

25 comprises: extracting an address that is associated with the received packet, ignoring the

received packet when the address does not match an identifier that is associated with the endpoint, and extracting a command from the received packet when the address is matched to the identifier.

8. The method of claim 2, wherein processing the received packet further comprises: extracting a group address that is associated with the received packet, ignoring the received packet when the group address does not match at least one group identifier that is associated with the endpoint, and extracting a command from the received packet when the group address matches at least one group identifier that is associated with the endpoint.

9. The method of claim 2, wherein formatting a packet for transmission corresponds to formatting a packet according to a protocol, wherein the protocol includes a asynchronous flag field, a health flag field, a payload field, and an error check and detection field, wherein the payload field is defined by a predetermined sequence when the asynchronous flag field is not set, and wherein the payload field is flexibly defined when the asynchronous flag field is set.

10. The method of claim 2, further comprising: selecting a packet sequence number based on the current day of the week, and wherein formatting the packet for transmission includes organizing a packet payload according to the selected packet sequence number.

11. The method of claim 2, further comprising: indexing a table by the current day of the week, retrieving a group of data identifiers from the indexed table, and wherein formatting the packet for transmission includes organizing data that is associated with the retrieved group of a data identifiers in a payload field of the packet.

12. An event processor in an endpoint, comprising:
- a means for executing an idle function while waiting for an event;
 - a means for detecting a trigger for the event;
 - a means for evaluating the event after the trigger is detected;
 - 5 a means for processing a received packet when the event corresponds to a received packet detection;
 - a means for recording at least one metering parameter when the event corresponds to a scheduled recording cycle;
 - a means for formatting a packet for transmission when the event
 - 10 corresponds to a scheduled reporting cycle; and
 - a means for starting a packet transmission after formatting the at least one packet for transmission.